

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-41

Name: Lake Madison

County: Lake

Legal Description: T106-R51, 52-Sec. 21-23, 25-27, 29, 30-32

Location from nearest town: 5 miles southeast of Madison, SD

Dates of present survey: July 21-23, 2008 (netting); September 2, 2008 (electrofishing)

Dates of last survey: July 23-25, 2007 (netting); August 29, 2007 (electrofishing)

Primary Game and Forage Species	Secondary and Other Species
Walleye	Northern Pike
Yellow Perch	Smallmouth Bass
Black Crappie	Bluegill
	Black Bullhead
	White Sucker
	Common Carp
	Bigmouth Buffalo
	Green Sunfish
	Hybrid Sunfish
	Channel Catfish

PHYSICAL DATA

Surface area: 2,642 acres

Maximum depth: 16 feet

Volume: 27,153 acre-feet

Contour map available: Yes

OHWM elevation: 1603.7

Outlet elevation: 1603.2

Lake elevation observed during the survey: Full, flowing out the outlet

Beneficial use classifications: (4) warmwater permanent fish life propagation, (7) immersion recreation, (8) limited-contact recreation and (9) fish and wildlife propagation and stock watering.

Watershed area: 29,191 acres

Mean depth: 8 feet

Shoreline length: 15.7 miles

Date mapped: 2002

Date set: November, 1980

Date set: November, 1980

Introduction

Lake Madison is a natural lake, second in a chain of four lakes (Herman, Madison, Round and Brant), formed by receding glacial ice. It was named for the 1875 town of Madison, originally located on the south shore of the lake. William Van Eps, the surveyor who platted the original town, named it Madison because he thought it resembled his hometown of Madison, Wisconsin.

Ownership of Lake and Adjacent Lakeshore Properties

Lake Madison is listed as meandered public water in the State of South Dakota Listing of Meandered Lakes and the South Dakota Department of Game, Fish, and Parks (GFP) manages the fishery. GFP also owns and manages access areas on the south, west and north shores of the lake. The remainder of the shoreline property is privately owned.

Fishing Access

The Payne Access Area on the west side of Lake Madison has a double lane boat ramp with a dock, public toilet and excellent shore fishing access. The Johnson Point Access Area on the north side of the lake has a double wide boat ramp with a dock, public toilet and excellent shore fishing access as well. The Stratton Access Area is located on the north shore of the lake and offers limited shore fishing opportunity. The Walker's Point Recreation Area on the south shore of the lake offers a double wide boat ramp with a dock, fish cleaning station, public toilets, and camping facilities with electric hookups. There is also a handicapped-accessible fishing dock as well as excellent shore fishing areas.

Field Observations of Water Quality and Aquatic Vegetation

The Secchi depth measurement in Lake Madison this year was 1.2 m (48 in). Some sago pondweed (*Potamogeton pectinatus*) was observed during the survey.

BIOLOGICAL DATA

Methods:

Lake Madison was sampled on July 21-23, 2008 with six overnight gill-net sets and nine overnight trap-net sets. The trap nets are constructed with 19-mm-bar-mesh ($\frac{3}{4}$ in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads. The gill nets are 45.7 m long x 1.8 m deep (150 ft long x 6 ft deep) with one 7.6 m (25 ft) panel each of 13, 19, 25, 32, 38 and 51-mm-bar-mesh ($\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, and 2 in) monofilament netting. Two hours of nighttime electrofishing were done on September 2, 2008 to evaluate walleye recruitment. Sampling locations are displayed in Figure 6.

Results and Discussion:

Gill Net Catch

Yellow perch comprised 77.8% of the gill-net catch this year followed by white sucker at 9.3% (Table 1). Walleye, black crappie, bigmouth buffalo, black bullhead, northern pike, and common carp were also sampled.

Table 1. Total catch from six overnight gill-net sets at Lake Madison, Lake County, July 21-23, 2008.

Species	Number	Percent	CPUE ¹	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Yellow Perch	608	77.8	101.3	+40.3	121.6	25	3	109
White Sucker	73	9.3	12.2	+2.6	15.9	68	62	100
Walleye	35	4.5	5.8	+1.8	19.1	93	7	86
Black Crappie	31	4.0	5.2	+1.5	2.0	45	0	114
Bigmouth Buffalo	13	1.7	2.2	+1.4	3.0	9	0	105
Black Bullhead	12	1.5	2.0	+1.2	7.5	17	8	104
Northern Pike	5	0.6	0.8	+0.5	0.2	--	--	--
Common Carp	4	0.5	0.7	+0.6	3.1	--	--	--

* 10 years (1998-2007)

Trap Net Catch

Yellow perch (42.5%), black crappie (23.8%) and black bullhead (11.7%) were the most abundant species sampled in the trap nets (Table 2). Eight other species were also sampled.

Table 2. Total catch from nine overnight trap net sets at Lake Madison, Lake County, July 21-23, 2008.

Species	Number	Percent	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Yellow Perch	290	42.5	32.2	+18.0	43.8	5	2	102
Black Crappie	162	23.8	18.0	+6.2	13.6	54	8	110
Black Bullhead	80	11.7	8.9	+3.3	89.1	76	33	92
Bigmouth Buffalo	55	8.1	6.1	+3.1	8.2	82	20	96
Common Carp	45	6.6	5.0	+3.3	13.0	76	67	95
Walleye	22	3.2	2.4	+1.2	4.6	--	--	88
White Sucker	11	1.6	1.2	+0.8	18.1	82	82	98
Bluegill	8	1.2	0.9	+0.5	3.0	--	--	--
Green Sunfish	5	0.7	0.6	+0.3	0.9	--	--	--
Northern Pike	3	0.4	0.3	+0.2	0.4	--	--	--
Channel Catfish	1	0.1	0.1	+0.1	0.1	--	--	--

*10 years (1998-2007)

Walleye

Management objective: Maintain a walleye population with a gill-net CPUE of at least 20, a PSD range of 30-60, and a growth rate of 14 inches by age-3.

¹ See Appendix A for definitions of CPUE, PSD, and mean Wr.

A partial winterkill occurred during the winter of 2007-2008 and was likely responsible for the decline in walleye gill-net CPUE observed this year. Age-1 fish, from the strong 2007 year class, comprised nearly 60% of the 2008 sample. CPUE of walleyes over stock length (10 in) was only 2.3 per net and they were mostly fish from the strong 2005 year-class (Table 4 and Figure 1). No age-2 walleyes were sampled (Table 4). Growth was similar to statewide, regional and large lakes means (Table 4) with fish reaching 35.6 cm (14 inches) before age-3.

Table 3. Walleye gill-net CPUE, PSD, RSD-P, and mean Wr for Lake Madison, Lake County, 1999-2008.

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Mean*
CPUE	36.7	12.2	24.7	16.2	9.0	8.0	10.7	14.3	17.3	5.8	18.3
PSD	3	5	27	71	85	67	6	23	25	93	32
RSD-P	0	0	0	4	56	25	2	4	0	7	9
Mean Wr	81	89	95	95	87	68	79	88	89	86	85

*10 years (1998-2007)

Table 4. Weighted mean length at capture (mm) for walleye captured in gill nets in Lake Madison, Lake County, 2003-2008. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends. Sample size in parentheses.

Year	1	2	3	4	5	6	7	8	9	10	11	12
2008 (35)	208 (21)	--	436 (9)	--	482 (5)	--	--	--	--	--	--	--
2007 (43)	--	360 (32)	376 (3)	457 (8)	--	--	--	--	--	--	--	--
2006 (57)	264 (44)	342 (1)	400 (10)	--	--	590 (1)	--	--	--	615 (1)	--	--
2005 (64)	257 (1)	306 (49)	337 (13)	--	--	--	--	620 (1)	--	--	--	--
2004 (32)	216 (22)	--	382 (4)	441 (2)	535 (3)	575 (1)	--	--	--	--	--	--
2003 (27)	307 (3)	403 (6)	--	516 (6)	522 (9)	--	556 (2)	614 (1)	--	--	--	--

Walleye fingerlings stocked in 2008 produced a strong year class (Table 5). While these fish had not been marked with oxytetracycline (OTC), about a third of the Lake Madison walleye had marks suggesting that marked fry stocked in Lake Herman again migrated downstream into Lake Madison this year. Size and condition of age-0 walleyes were similar to that of the strong 2007 year class. First-winter survival of the 2007 year class, as indicated by the ratio of age-1 to age-0 walleyes, was lower on Lake Madison than on the other waters surveyed this fall. The partial winterkill of fish on Madison may have had a negative impact. Possibly some age-1 walleyes moved downstream into Brant Lake which had a surprisingly high electrofishing catch of age-1 walleyes. Additionally, there is some evidence to suggest that survival of walleyes from very strong (> 300 fish/h electrofishing) year classes may be lower than in fish from smaller year classes. Although intense competition for food is a probable cause of lower survival in very strong year

classes, specific causes for increased mortality have not been identified and survival of fish from these very strong year classes can be highly variable.

Table 5. Age-0 and age-1 walleyes sampled during 2 hours of nighttime electrofishing on Lake Madison, Lake County, 1999-2008.

Year	Stocking	Age-0 CPH	80% C.I.	% stocked	Mean length (range; mm)	Wr	Age-1 CPH	80% C.I.	Mean length (range; mm)	Wr
2008	fingerling	347	200-495	²	145 (119-183)	95	19	15-23	251 (216-281)	83
2007	fingerling	378	210-493	81 ¹	150 (109-196)	87	0			
2006	none	4	1-7		199 (185-210)	109	10	6-14	309 (289-333)	101
2005	fingerling	128	82-174	100	158 (126-227)	90	0			
2004	none	2	0-4		163 (150-178)	102	30	21-39	244 (201-288)	80
2003	fingerling	293	186-400	100	154 (125-182)	87	2	1-3	312 (271-334)	86
2002	fry	12	7-17	90	209 (187-225)	110	4	0-8		
2001	none	4	1-6		222 (214-231)	106	0			
2000	none	15	6-24		190 (165-214)	98	58	31-85	267 (230-302)	83
1999	fry	166								

¹ Fingerlings marks (Madison stocking) were present on 71% of samples and fry marks (Herman stocking) were present on 10% of samples.

² Stocked fingerlings were not marked in 2008; however, approximately a third of the Madison sample exhibited faint fry marks indicating contribution from Lake Herman stocked walleye fry.

Yellow Perch

Management objective: Maintain a yellow perch population with a gill-net CPUE of at least 50 and a PSD range of 30-60.

Yellow perch gill-net CPUE remained over 100 (Table 6). Good year classes were produced in 2005, 2006 and 2007, which was somewhat of a surprise because larval trawl samples indicated relatively poor production in those years. Madison was stocked with 187,000 chemically-marked yellow perch fingerlings in 2007. Approximately 50% of a sample of yellow perch was from the 2007 stocking of marked fish, indicating that stocking made a significant contribution to the population. Growth of age-1 through age-3 fish is faster than the statewide, regional and large lakes and impoundments means (Table 7) (Figure 2).

Table 6. Yellow perch gill-net CPUE, PSD, RSD-P, and mean Wr for Lake Madison, Lake County, 1999-2008.

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Mean*
CPUE	90.0	131.3	67.3	378.8	261.3	72.3	30.7	17.5	115.3	101.3	121.6
PSD	67	36	40	2	60	85	94	49	10	25	50
RSD-P	31	15	18	0	0	8	47	19	5	3	17
Mean Wr	102	106	108	87	95	98	96	104	109	109	101

*10 years (1998-2007)

Table 7. Average back-calculated lengths (mm) for each age class of yellow perch in Lake Madison, Lake County, 2008.

Year Class	Age	N	Back-calculation Age							
			1	2	3	4	5	6	7	8
2007	1	450	105							
2006	2	103	105	200						
2005	3	50	111	184	217					
2004	4	6	116	175	195	216				
All Classes		609	109	186	206	216				
Statewide Mean			86	145	190	220	242			
Region III Mean			94	159	208	242	281			
LLI* Mean			86	146	192	225	249			

*Large Lakes and Impoundments (>150 acres)

Black Crappie

Management objective: Maintain a black crappie population with a trap net CPUE of at least 20 and a PSD of at least 40.

Black crappie trap-net CPUE and PSD increased again in 2008; and CPUE is approaching our management objective (Table 8). An abundance of black crappies were observed during fall electrofishing and winter commercial seining. The size structure of the population is excellent (Figure 3) with a PSD of 54, and a mean length of 193 mm (7.6 in). Lengths ranged from 120 mm (4.7 in) to 310 mm (12.2 in).

Growth is similar to regional, statewide and large lakes means (Table 9) and recruitment has become relatively consistent for a large lake population. Fish from each of the 2004-2007 year classes were sampled with age-2 fish being the most abundant.

Table 8. Black crappie trap-net CPUE, PSD, RSD-P, and mean Wr for Lake Madison, Lake County, 1999-2008.

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Mean*
CPUE	0.5	2.3	1.6	10.0	18.7	47.5	31.5	8.9	14.2	18.0	13.6
PSD	--	43	21	11	32	61	92	15	49	54	41
RSD-P	--	17	14	5	6	5	7	11	25	8	11
Mean Wr	--	130	136	124	108	111	114	120	110	110	119

*10 years (1998-2007)

Table 9. Average back-calculated lengths (mm) for each age class of black crappie in Lake Madison, Lake County, 2008.

Year Class	Age	N	Back-calculation Age							
			1	2	3	4	5	6	7	8
2007	1	70	104							
2006	2	78	90	192						
2005	3	6	105	203	253					
2004	4	2	87	170	228	250				
All Classes		156	96	188	240	250				
Statewide Mean			93	183	221	252	275			
Region III Mean			93	185	225	259	284			
LLI* Mean			90	192	241	272	299			

*Large Lakes and Impoundments (>150 acres)

All Species

Common carp abundance was the lowest seen since 2001 (Table 10). Bluegill and walleye CPUE are also low. CPUE for other species remains within previously observed ranges. White bass have been observed in Lake Madison, but have not shown up in our annual surveys yet.

Table 10. Gill-net (GN) and trap-net (TN) CPUE for all fish species sampled in Lake Madison, Lake County, 1999-2008.

Species	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
COC (GN)	1.3	1.7	1.0	16.8	2.0	1.5	1.7	2.0	2.8	0.7
COC (TN)	7.5	14.6	3.3	29.0	12.2	28.0	4.8	6.1	12.5	5.0
WHS (GN)	5.3	4.0	8.3	16.4	56.3	26.8	22.5	6.8	8.5	12.2
WHS (TN)	10.3	5.9	16.4	41.4	11.8	9.4	74.2	1.5	0.7	1.2
BIB (GN)	--	--	--	1.2	4.7	14.3	3.8	5.0	0.5	2.2
BIB (TN)	4.9	10.4	5.3	5.3	7.9	8.2	7.5	20.5	7.2	6.1
BLB (GN)	6.0	7.0	2.0	16.8	19.0	3.0	0.7	8.0	4.5	2.0
BLB (TN)	48.9	28.3	11.4	601.1	34.5	10.2	5.4	3.0	53.5	8.9
YBH (GN)	--	--	--	--	--	--	--	--	--	--
YBH (TN)	--	--	0.1	0.1	--	--	--	--	--	--
CCF (GN)	--	--	--	--	--	--	--	--	--	--
CCF (TN)	--	--	--	--	0.1	0.1	0.1	--	0.6	0.1
NOP (GN)	--	--	0.3	--	0.3	0.8	--	--	0.3	0.8
NOP (TN)	0.1	0.1	--	1.5	1.4	0.7	0.1	--	0.1	0.3
GSF (GN)	--	--	--	--	--	--	--	--	0.3	--
GSF (TN)	2.0	1.3	1.2	0.6	2.1	0.1	0.2	1.0	0.9	0.6
HYB (GN)	--	--	--	--	--	--	--	--	--	--
HYB (TN)	--	--	0.6	0.6	1.0	0.2	--	0.5	0.3	--
BLG (GN)	--	0.3	--	--	--	--	--	--	0.3	--
BLG (TN)	0.4	4.2	3.4	1.1	6.7	1.9	4.6	6.1	1.0	0.9
SMB (GN)	--	--	--	--	--	--	--	1.5	1.8	--
SMB (TN)	--	--	--	--	--	--	--	2.1	1.6	--
BLC (GN)	--	--	--	--	1.0	3.8	3.2	2.5	9.5	5.2
BLC (TN)	0.5	2.3	1.6	10.0	18.7	47.5	31.5	8.9	14.2	18.0
YEP (GN)	90.0	131.3	67.3	378.8	261.3	72.3	30.7	17.5	115.3	101.3

YEP (TN)	6.4	15.0	60.9	184.0	149.3	5.4	1.2	0.4	8.5	32.2
WAE (GN)	36.7	20.0	24.7	16.2	9.0	8.0	10.7	14.3	17.3	5.8
WAE (TN)	10.5	9.1	1.8	0.5	1.3	3.0	1.0	2.1	1.0	2.4

COC (Common Carp), WHS (White Sucker), BIB (Bigmouth Buffalo), BLB (Black Bullhead), YBH (Yellow Bullhead), CCF (Channel Catfish), NOP (Northern Pike), GSF (Green Sunfish), HYB (Hybrid Sunfish), BLG (Bluegill), SMB (Smallmouth Bass), BLC (Black Crappie), YEP (Yellow Perch), WAE (Walleye),

Carp Research and Commercial Fishing

This is the second year of a five year SDSU research project gathering information on common carp in Lakes, Herman Madison, and Brant. In spring 2008, 5,484 carp were tagged. This fall, 435,000 pounds of carp were removed and 21% of the tags returned by commercial fishing indicating that the carp biomass in Lake Madison exceeded 2 million pounds or nearly 800 pounds per acre.

Creel Survey Results

Winter 2007-08

Winter fishing pressure was extremely low (Table 11). Anglers reported catching and releasing a few walleyes, yellow perch and black crappies; however, none of the 64 parties had kept fish at the time of their interview. The complete lack of harvest is a surprise because lake survey and fall electrofishing found abundant small walleyes, yellow perch and black crappies and fall fishing was very good. Catchability of fish during the winter must be extremely low either due to a lack of feeding activity or abundant forage under the ice.

Angling parties were asked the question, "What would you consider to be the best daily limit for panfish (perch, crappies, and bluegills)?" The percent that responded to each of the following choices was as follows: 5 (0%), 10 (50%), 15 (20%), 20 (3%), 25 (27%) and 25+ (0%).

Table 11. Estimates of fishing pressure and catch (harvest) of fish in Lake Madison from December through March, 2002-2008.

Year	Fishing Pressure (h)	Walleye Catch (Harvest)	Northern Pike Catch (Harvest)	Yellow Perch Catch (Harvest)	Black Crappie Catch (Harvest)
2007-08	1,962	48 (0)	0 (0)	13 (0)	6 (0)
2006-07	2,810	228 (166)	11 (0)	11 (0)	38 (28)
2005-06	8,307	626 (168)	6 (6)	65 (65)	338 (322)
2004-05	14,923	2,325 (433)	273 (233)	314 (294)	389 (307)
2003-04	4,614	275 (250)	0 (0)	2,414 (2,179)	0 (0)
2002-03	28,759	575 (100)	446 (321)	233,970 (78,335)	33 (33)

Table 12. Number of angler interviews and estimates of hourly catch rate (harvest rate) of fish in Lake Madison from December through March, 2002-2008.

Year	Number of Interviews	Walleye Catch (Harvest)	Northern Pike Catch (Harvest)	Yellow Perch Catch (Harvest)	Black Crappie Catch (Harvest)
2007-08	64	0.02 (0)	0 (0)	0.007 (0)	0.003 (0)
2006-07	86	0.08 (0.06)	0.004 (0)	0.004 (0)	0.01 (0.01)
2005-06	155	0.08 (0.02)	0.001 (0.001)	0.008 (0.008)	0.04 (0.04)
2004-05	328	0.16 (0.03)	0.02 (0.02)	0.02 (0.02)	0.03 (0.02)
2002-03	103	0.06 (0.05)	0 (0)	0.52 (0.47)	0 (0)
2003-04	426	0.02 (0.004)	0.02 (0.01)	8.14 (2.72)	0.001 (0.001)

Summer and Fall 2008

Summer fishing pressure increased from 2007 (Table 13). Monthly fishing pressure was highest in May and June. Nearly 78% of fishing was done by boat and 76% occurred on the weekends. Just over half of the angling parties interviewed were fishing for walleyes (53%) and 13% and 11% of anglers were primarily targeting yellow perch and black crappies. About 4% of parties interviewed were non-residents.

Fall 2008 fishing pressure was similar to 2006 and 2007 (Table 15) and comprised about 30% of the total fishing pressure for the year. The majority of angling parties were primarily targeting yellow perch (63%) and about 13% were nonresidents.

Summer angling parties were asked the question, "What would you consider to be the best daily limit for panfish (perch, crappies, and bluegills)?" The percent that responded to each of the following choices was as follows: 5 (2%), 10 (34%), 15 (16%), 20 (5%), 25 (39%) and 25+ (4%). The percentages tended to favor higher daily bag limits with fall anglers. They responded as follows: 5 (0%), 10 (11%), 15 (24%), 20 (11%), 25 (54%) and 25+ (0%).

The summer walleye harvest was down from 2007 (Table 13). Many small age-1 and some age-0 walleyes were caught and released by anglers. About 95% of the walleyes harvested were over 35.6 cm (14 in) long.

Anglers enjoyed good fishing for yellow perch in late-summer and fall (Tables 14 and 16). Highest monthly catch (2.9/h) and harvest (0.9/h) rates occurred in August; however the highest monthly harvest was in September. A large percentage of yellow perch harvested in late-summer were from the 2005 year class and 28-33 cm (9-11 in) long. By fall, smaller yellow perch (20-23 cm or 8-9 in) were dominant in the harvest. Late-summer recruitment of young fish (age-1+ or age 2+) to fall fishery has been commonly documented in Lake Madison (Casey Schoenebeck, Ph.D student in Wildlife and Fisheries at SDSU).

Black crappie catch/harvest rates were similar to 2007 (Tables 14 and 16). After 10 years of providing little to no crappie fishery (1994-2003), Lake Madison has provided good crappie fishing for five consecutive years (Tables 13 and 15). Black bullhead catch and harvest were the lowest on record

Table 13. Estimates of fishing pressure and catch (harvest) of fish on Lake Madison from May through August, 1999-2008.

Year	Pressure (h)	Walleye Catch (Harvest)	Yellow Perch Catch (Harvest)	Black Crappie Catch (Harvest)	Bullheads Catch (Harvest)	Bluegill Catch (Harvest)
2008	18,521	5,168 (725)	10,278 (3,372)	5,200 (2,161)	125 (20)	31 (31)
2007	13,231	5,607 (2,628)	6,710 (2,628)	3,555 (1,598)	188 (129)	55 (55)
2006	21,792	3,227 (2,217)	574 (412)	4,933 (3,659)	424 (76)	0 (0)
2005	28,694	8,745 (1,495)	4,399 (3,831)	5,497 (4,797)	839 (0)	170 (100)
2004	36,903	10,101 (2,666)	10,286 (7,284)	15,328 (13,532)	4,998 (1,925)	335 (223)
2003	32,116	4,532 (3,027)	45,603 (28,334)	672 (650)	10,642 (2,151)	493 (54)
2002	14,632	696 (253)	29,417 (12,690)	94 (60)	5,766 (848)	148 (72)
2001	11,477	140 (426)	4,069 (3,265)	0 (0)	110 (325)	0 (0)
2000	18,660	11,098 (2,815)	801 (654)	0 (0)	4,628 (1,285)	0 (0)
1999	12,141	9,753 (507)	2,708 (1,865)	465 (0)	3,155 (2,439)	0 (0)
1998	18,374	7,307 (1,184)	4,735 (3,712)	0 (0)	3,561 (686)	0 (0)

Table 14. Number of interviews and estimates of catch and harvest rates (number/hour) on Lake Madison from May through August, 1999-2008.

Year	Number of Interviews	Walleye Catch (Harvest)	Yellow Perch Catch (Harvest)	Black Crappie Catch (Harvest)	Bullheads Catch (Harvest)	Bluegill Catch (Harvest)
2008	142	0.28 (0.04)	0.55 (0.18)	0.28 (0.12)	0.01 (0.001)	0.002 (0.002)
2007	133	0.42 (0.20)	0.51 (0.20)	0.26 (0.12)	0.01 (0.01)	0.004 (0.004)
2006	216	0.15 (0.10)	0.03 (0.02)	0.23 (0.17)	0.02 (0.04)	0 (0)
2005	314	0.30 (0.04)	0.15 (0.13)	0.19 (0.17)	0.03 (0)	0.006 (0.004)
2004	470	0.27 (0.07)	0.28 (0.20)	0.42 (0.37)	0.14 (0.05)	0.009 (0.006)
2003	276	0.14 (0.09)	1.42 (0.88)	0.02 (0.02)	0.33 (0.07)	0.02 (0.002)
2002	139	0.05 (0.02)	2.01 (0.87)	0.01 (0.01)	0.39 (0.06)	0.01 (0.005)
2001	82	0.05 (0.01)	0.65 (0.36)	0 (0)	0.04 (0.01)	0 (0)
2000	112	0.59 (0.15)	0.04 (0.04)	0 (0)	0.25 (0.07)	0 (0)
1999	152	0.80 (0.04)	0.22 (0.15)	0.04 (0)	0.26 (0.20)	0 (0)
1998	207	0.40 (0.06)	0.26 (0.20)	0 (0)	0.19 (0.04)	0 (0)5

Table 15. Estimates of fishing pressure and catch (harvest) of fish on Lake Madison from September through October, 2005-2008.

Year	Pressure (h)	Walleye Catch (Harvest)	Yellow Perch Catch (Harvest)	Black Crappie Catch (Harvest)	Bullheads Catch (Harvest)	Bluegill Catch (Harvest)
2008	10,402	2,399 (291)	9,346 (7,858)	1,432 (1,171)	110 (5)	58 (22)
2007	8,194	10,522 (37)	21,702 (14,243)	792 (283)	66 (16)	155 (33)
2006	11,041	413 (241)	1,866 (1,311)	3,964 (1,921)	273 (37)	142 (118)
2005	21,231	5,505 (937)	13,548 (11,458)	4,436 (3,868)	6 (0)	166 (82)

Table 16. Number of interviews and estimates of catch and harvest rates (number/hour) on Lake Madison from September through October, 2005-2008.

Year	Number of Interviews	Walleye Catch (Harvest)	Yellow Perch Catch (Harvest)	Black Crappie Catch (Harvest)	Bullheads Catch (Harvest)	Bluegill Catch (Harvest)
2008	177	0.23 (0.02)	0.90 (0.76)	0.14 (0.11)	0.01 (0.001)	0.006 (0.002)
2007	97	1.94 (0.05)	2.65 (1.74)	0.10 (0.03)	0.01 (0.002)	0.02 (0.004)
2006	140	0.04 (0.02)	0.17 (0.15)	0.36 (0.17)	0.02 (0.01)	0.01 (0.01)
2005	247	0.26 (0.04)	0.64 (0.54)	0.21 (0.18)	0.001 (0)	0.01 (0.01)

MANAGEMENT RECOMMENDATIONS

1. Monitor the Lake Madison fishery by conducting annual netting and electrofishing surveys.
2. Accomplish our walleye management objective by stocking OTC-marked fry or fingerlings into voids of natural reproduction as determined by fall electrofishing results.
3. Continue efforts to develop a habitat management plan that incorporates artificial structures, fishing piers, rough fish management, and watershed management. Investigate the use of artificial structures to enhance spawning habitat and the use of barriers to protect panfish spawning areas from the destructive activities of common carp.
4. Consider using barriers to keep common carp away from their preferred spawning habitat to limit reproduction and control the carp population.
5. Encourage commercial fishing whenever rough fish abundance warrants it.

Table 17. Stocking record for Lake Madison, Lake County, 1991-2008.

Year	Number	Species	Size
1991	4,200,000	Walleye	Fry
	150,000	Walleye	Sml. Fingerling
	60	Walleye	Adult
	75,341	Yellow Perch	Fingerling
1992	300,000	Walleye	Sml. Fingerling
	34	Walleye	Adult
	19,625	Yellow Perch	Fingerling
1993	283,766	Yellow Perch	Fingerling
1994	101,400	Fathead Minnow	Adult
	300,000	Walleye	Fry
	354,000	Walleye	Sml. Fingerling
1995	192,700	Fathead Minnow	Adult
	11	Walleye	Adult
	501	Walleye	Lrg. Fingerling
	42,537	Yellow Perch	Adult
	141,725	Yellow Perch	Fingerling
1996	189,400	Bluegill	Fingerling
	561,800	Walleye	Sml. Fingerling
1997	2,800,000	Walleye	Fry
	27,980	Yellow Perch	Adult
1999	2,600,000	Walleye	Fry
	28,000	Yellow Perch	Adult
2002	2,500,000	Walleye	Fry
2003	280,680	Walleye	Sml. Fingerling
2005	264,200	Walleye	Sml. Fingerling
2007	264,440	Walleye	Sml. Fingerling
	187,000	Yellow Perch	Fingerling
2008	218,020	Walleye	Sml. Fingerling

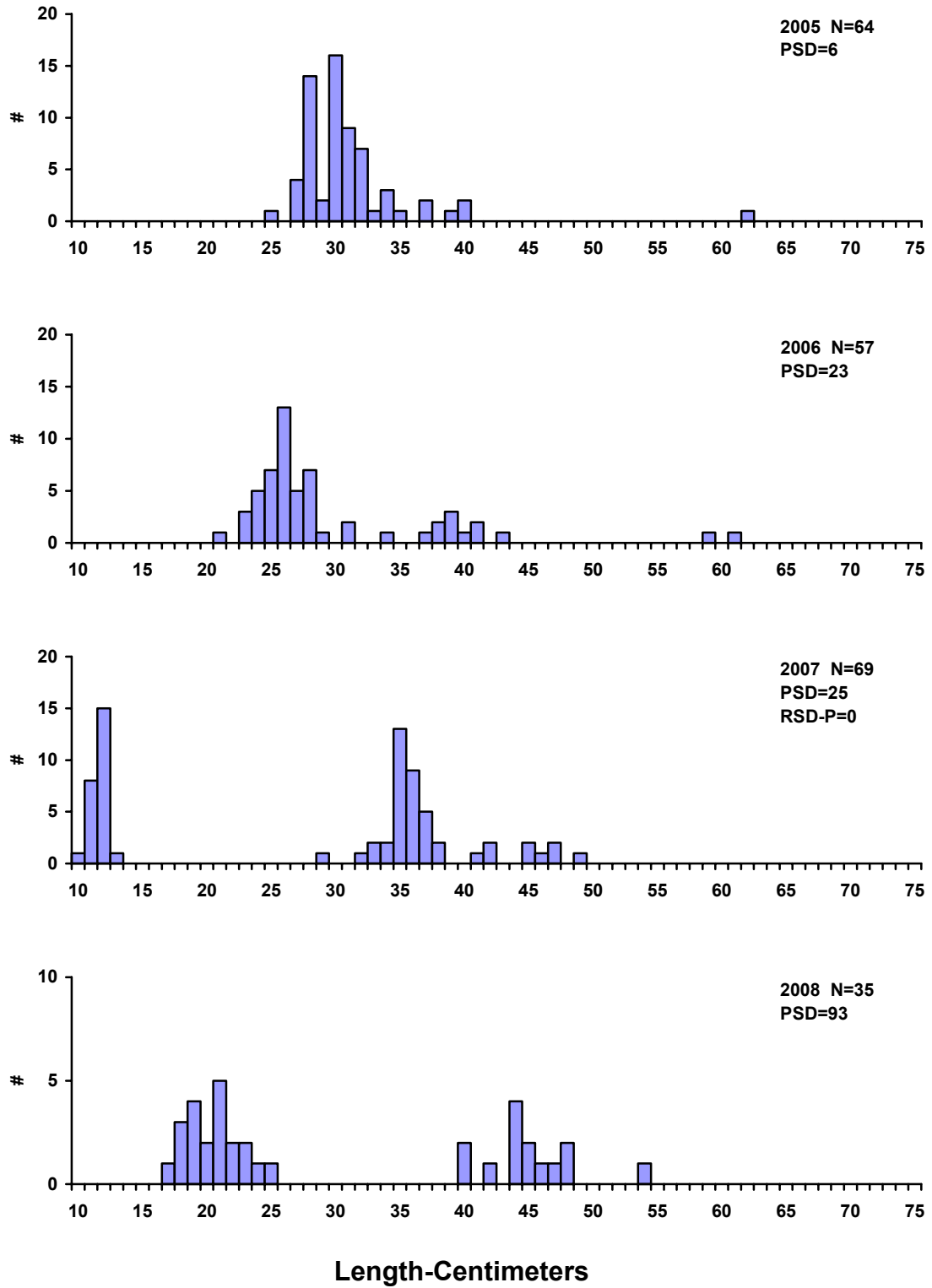


Figure 1. Length frequency histograms for walleye sampled with gill nets in Lake Madison, Lake County, 2005-2008.

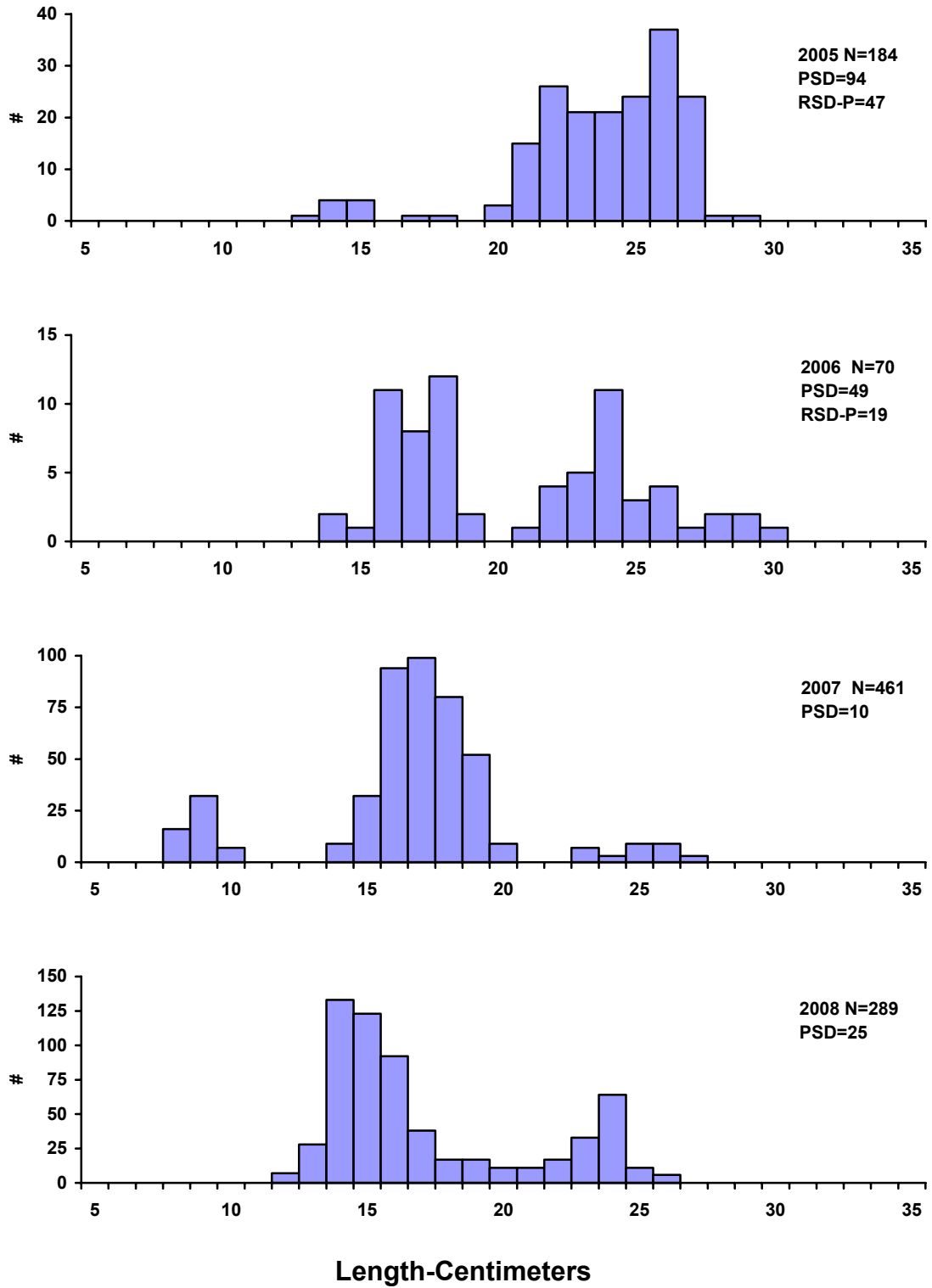


Figure 2. Length frequency histograms for yellow perch sampled with gill nets in Lake Madison, Lake County, 2005-2008.

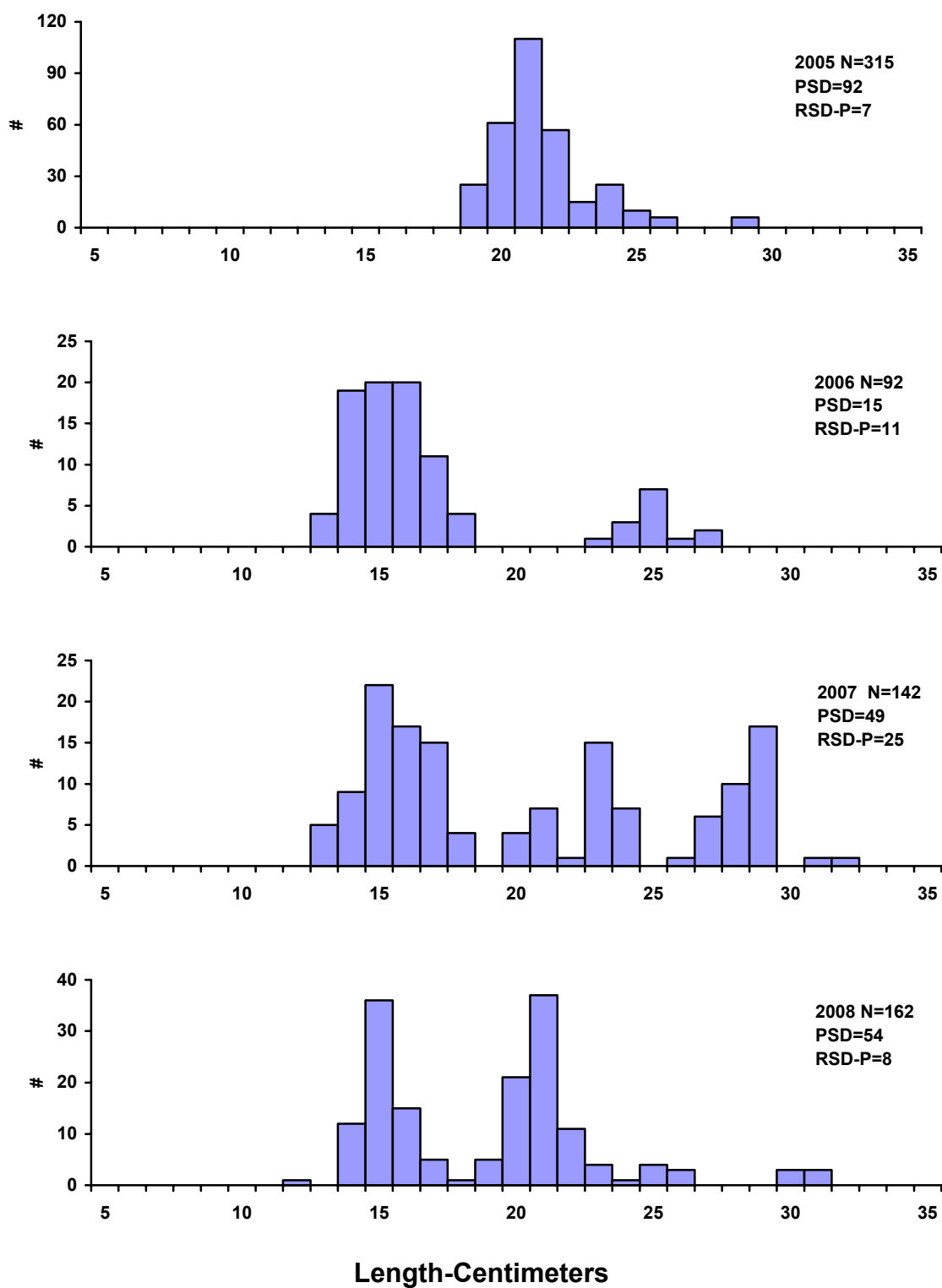
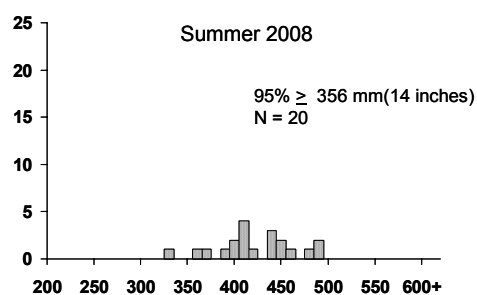
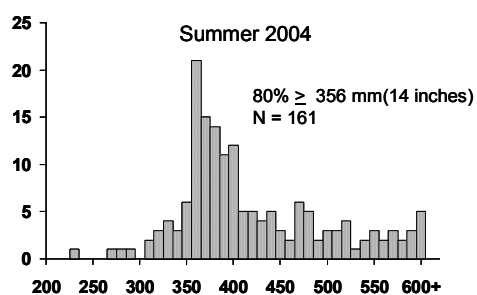
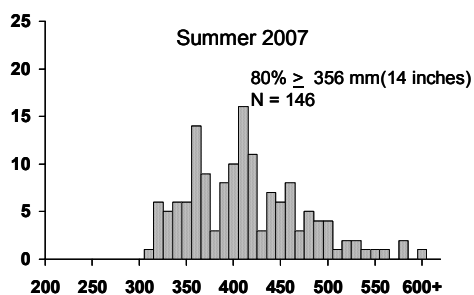
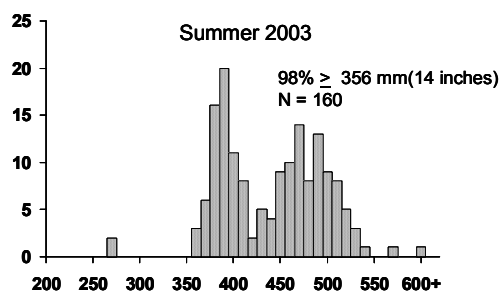
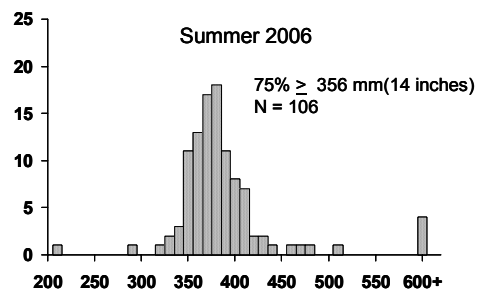
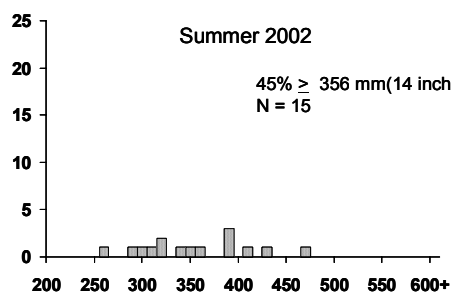
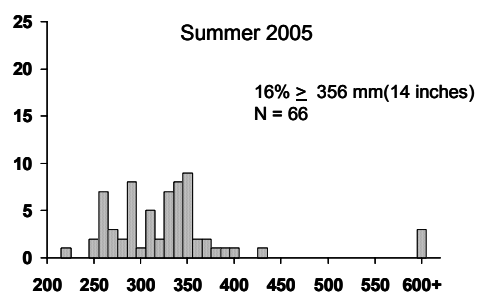
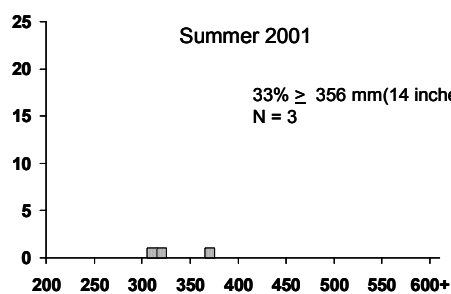


Figure 3. Length frequency histograms for black crappie sampled with trap nets in Lake Madison, Lake County, 2005-2008.



Length (mm)

Length (mm)

Figure 4. Length frequency of angler-harvested walleyes measured by the creel clerk during winter and summer creel surveys on Lake Madison, 2001-2008.

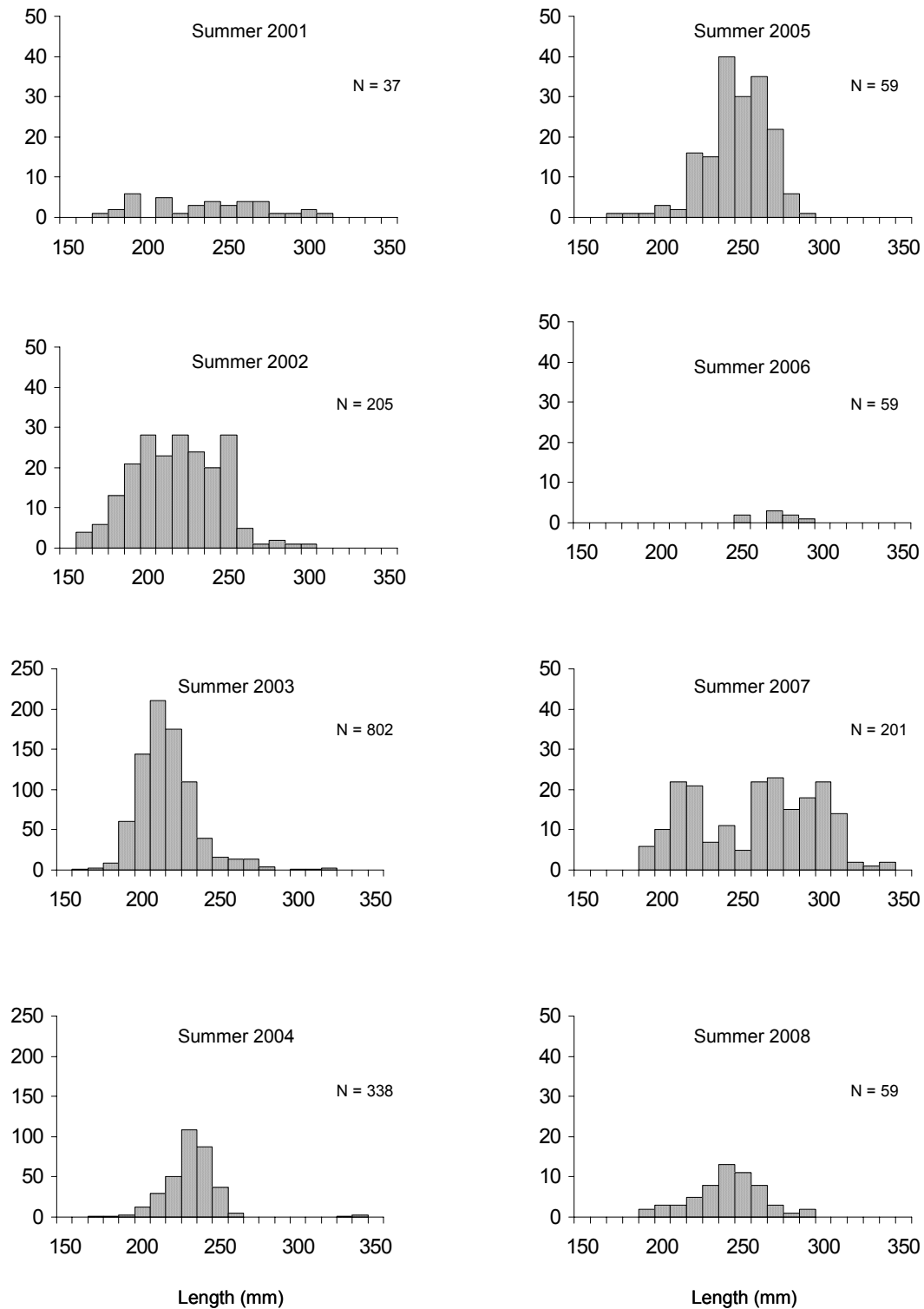
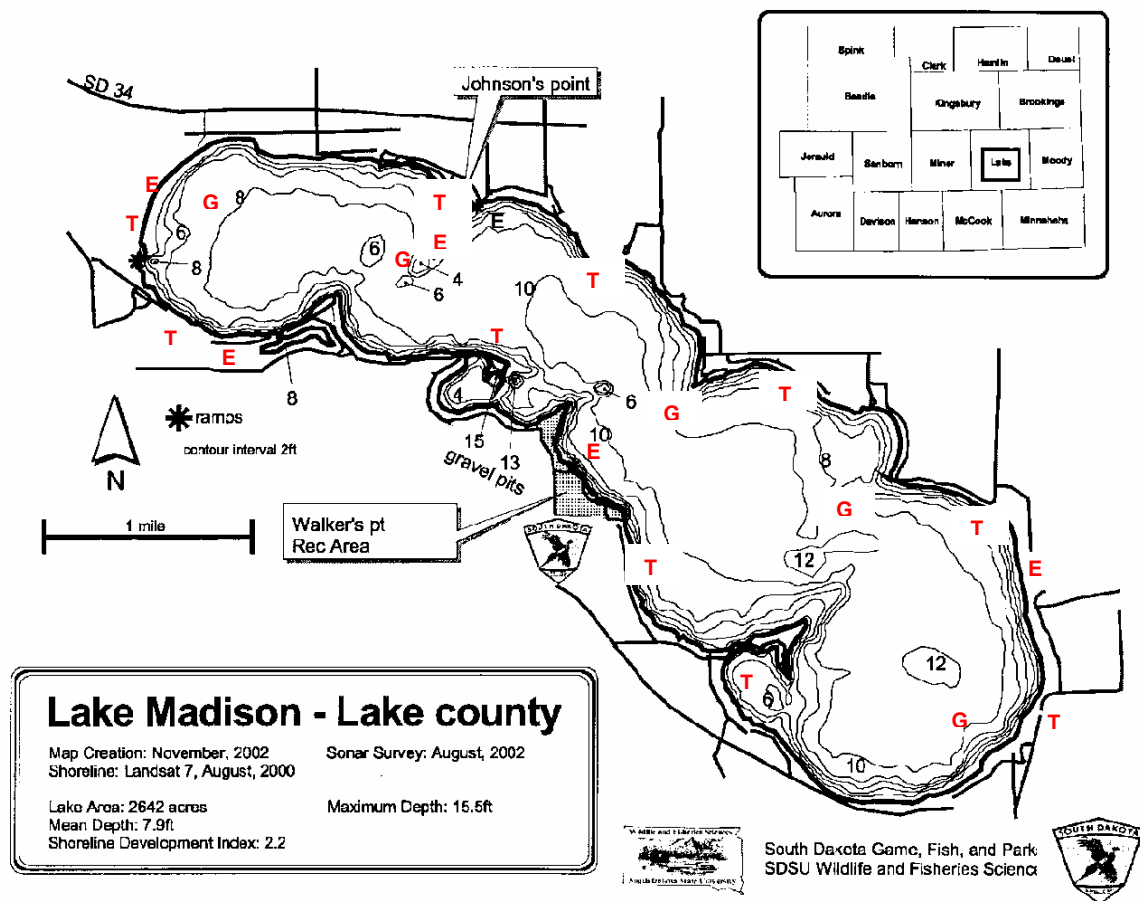


Figure 5. Length frequency of angler-harvested yellow perch measured by the creel clerk during summer creel surveys on Lake Madison, 2001-2008.



Legend Trap Net Sites: T
 Gill Net Sites: G
 Electrofishing Sites: E

Figure 6. Sampling locations on Lake Madison, Lake County, 2008.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch Per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$\text{PSD} = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$\text{RSD-P} = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters.

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25	38	51	63	76
Sauger	20	30	38	51	63
Yellow perch	13	20	25	30	38
Black crappie	13	20	25	30	38
White crappie	13	20	25	30	38
Bluegill	8	15	20	25	30
Largemouth bass	20	30	38	51	63
Smallmouth bass	18	28	35	43	51
Northern pike	35	53	71	86	112
Channel catfish	28	41	61	71	91
Black bullhead	15	23	30	38	46
Common carp	28	41	53	66	84
Bigmouth buffalo	28	41	53	66	84
Smallmouth buffalo	28	41	53	66	84

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.